RUBBER manufacturers association

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March 11, 1999

Mr. Frank Anscombe
U.S. Environmental Protection Agency
Region 5 (G-17J)
77 West Jackson Boulevard
Chicago, IL 60604

Mr. Darryl Hogg
Canada Ontario Agreement Coordination
Ministry of Environment
40 St. Clair Avenue West, 12th Floor
Toronto, Ontario M4V 1M2

Dear Mr. Anscombe and Mr. Hogg:

On behalf of the members of the Rubber Manufacturers Association (RMA), I am pleased to provide the Great Lakes Binational Toxics Strategy (BNTS) OCS Workgroup with RMA's comments on the Battelle Memorial Institute draft report entitled *Great Lakes Binational Toxics Strategy Octachlorostyrene (OCS) Report: A Review of Potential Sources* (hereinafter referred to as the "draft report"), dated December 22, 1998.

The Rubber Manufacturers Association is the national trade association for the rubber products industry, and represents a $50 billion domestic manufacturing sector. RMA represents more than 120 companies that manufacture various rubber products, including tires, hoses, belts, seals, molded goods, and other finished rubber products.

A*s mentioned in the comments filed by the Council of the Great Lakes Industries on the draft report, RMA has serious concerns about the analysis and characterization of the tire industry as a potential source of OCS. In particular, RMA does not believe that tire manufacturing operations are a source of either hexachlorobenzene (HCB) or OCS emissions, based on the raw materials and physical and reaction chemistry present in tire manufacturing. RMA is planning to conduct emissions testing to show that HCB is not emitted during the tire

manufacturing process, and will present the results to RMA upon the completion of the emission testing.

The tire industry is willing to work with you to provide accurate information regarding the tire manufacturing process. Please feel free to contact me with any questions regarding these comments. I may be reached at 202-682-4839 or via e-mail at tracey@rma.org.

Sincerely,

Tracey J. Norberg
Director, Environmental Affairs

Cc: George Kuper, CGLI
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Rubber Manufacturers AssociationComments on the
Draft Great Lakes Binational Toxics Strategy Octachlorostyrene (OCS) Report

Introduction

The Battelle Memorial Institute issued a draft report on December 22, 1998 entitled *Great Lakes Binational Toxics Strategy Octachlorostyrene (OCS) Report: A Review of Potential Sources* (hereinafter referred to as the "draft report") to US EPA's Great Lakes National Program Office. The Rubber Manufacturers Association (RMA) is pleased to submit comments on the draft report.

The Rubber Manufacturers Association is the national trade association for the rubber products industry, and represents a $50 billion domestic manufacturing sector. RMA represents more than 120 companies that manufacture various rubber products, including tires, hoses, belts, seals, molded goods, and other finished rubber products.

RMA is concerned with the characterization of the tire industry in the draft report and disagrees with the analysis of the tire industry. In particular, RMA believes that it is extremely unlikely or impossible for tire manufacturing to emit OCS. RMA bases this belief on the industry's knowledge of its manufacturing processes – specifically that tire manufacturing does not have sufficient radical chlorine or elevated temperatures to form OCS. In addition, RMA does not believe that tire manufacturing is a source of hexachlorobenzene (HCB) emissions, and plans to conduct testing to support this belief.

Basis for EPA Contractor's Position

In the draft report, rubber tire manufacturing operations have been identified as a potential source of OCS. As is explained below, the Rubber Manufacturers Association (RMA) disagrees with the draft report's analysis of the tire manufacturing industry and believes it is extremely unlikely or even impossible that OCS is emitted from tire manufacturing operations. We base our belief on several facts and our knowledge of the rubber tire manufacturing process.

RMA recognizes that the draft report does not purport to definitively identify sources of OCS. In fact, the draft report notes "the *scarcity of data* characterizing OCS emissions," and also points out that the Battelle study "was conducted as a *tentative gauge* of OCS emissions for selected potential sources and is *presented for discussion purposes only*." Draft report at page v (emphasis added). Yet the draft report recites several erroneous points, and therefore draws the incorrect tentative conclusion that OCS may be formed during the tire manufacturing process.

This inappropriate tentative conclusion is based on the following (sometimes inaccurate) assumptions outlined by Battelle in the draft report (Reference section 4.21 on page 51):

1. EPA recently – and in our view, incorrectly – identified rubber tire manufacturing as a source of hexachlorobenzene (HCB) emissions; and

2. The draft report makes what we believe to be several incorrect statements in the passage quoted below:

> Several steps in the tire manufacturing process show potential for generating OCS (including the mixing, milling, extruding, calendering, curing, and cementing operations). Carbon black is one of the ingredients in the rubber compound used to manufacture various components required in the production of rubber tires. Natural rubber contains chlorine. The mixing step combines raw materials, including carbon black in a mixer with the use of vulcanizing agents, plasticizers, and initiators. During milling, the rubber compound is heated to a fluid in preparation for extruding. Extruding shapes the rubber into profiles by forcing the hot fluid through dies. The calendering process uses hot rubber from the mills and forms it into fibers or thin sheets of rubber and rubber-coated materials. Curing presses and molds the various components of a tire together under high temperature and pressure. Prior to curing, an uncured tire is sprayed with a lubricant so that the tire does not adhere to the mold during curing. Cementing is the use of adhesives or solvents at various stages of tire building to improve adhesion of rubber components and prevent separation prior to curing. Due to the high temperature and presence of organic materials, OCS may be formed. *Draft Report at 51.*

RMA disagrees with the Battelle/EPA contention that rubber tire manufacturing is a source of OCS. The logic behind RMA's reasoning is described below.

1 Rubber Tire Manufacturing is not a Source of HCB Emissions

RMA is confident that HCB is not emitted during any tire manufacturing processes and is planning to conduct emissions testing soon to demonstrate this point. While EPA's current emissions inventories for the Clean Air Act section 112(c)(6) pollutants identify tire manufacturing as a source of HCB, these inventories are based solely on a single data point that RMA believes to be erroneous.

In 1994 and 1995, the rubber manufacturing industry completed a detailed study of emissions from its various process (mixing, milling, extruding, calendering, and curing) to help develop AP-42 factors for the industry. This study involved testing 23 generic rubber compounds representing a range of materials processed in the entire rubber industry. During the rubber-mixing portion of this study, HCB was detected during a single test of the emissions from one compound, Compound #3. RMA believes that this data point is not valid and that the HCB detection was caused by contamination of the emission sample. This belief is based on the fact that HCB is a common contaminant introduced by the thermal degradation of the adsorbent resin (XAD II) used for sampling. In addition, HCB was not detected in the emissions from any of the other 22 compounds tested in mixing and in none of the compounds tested in the other tire manufacturing processes (milling, extruding, calendering, and curing). Compound #3 was tested in the milling process, and HCB was not detected.

As will be discussed below, no physical or chemical mechanism for HCB formation exists within rubber tire manufacturing. RMA therefore is preparing to conduct additional tests this spring to demonstrate that this data point is not valid, and that HCB is not emitted during tire manufacturing. The results of these tests will be shared with EPA when they become available in the summer of 1999. Because the draft report's speculation about the presence of OCS in tire manufacturing processes is premised in large part on the presence of HCB, we believe that test results demonstrating the absence of HCB should lead EPA to conclude that OCS also is not emitted during tire manufacturing.

EPA HCB Emissions Inventory for Rubber Tire Manufacturing

Even if the single HCB data point was not due to testing contamination, the erroneous HCB emissions inventory calculation performed by US EPA in its *1990 Emissions Inventory Of Section 112(c)(6) Pollutants: POM, TCDD, TCDF, PCBs, HCB, Hg and Alkylated Pb, Final Report* issued April 1998, greatly inflated the estimate of HCB emissions from the industry. In that report EPA indicates that total national HCB emissions for the Tire Manufacturing industry are 869 pounds (reference Table 7-3). EPA based this calculation on information found in Table 7-1 of the report. Table 7-1 contains information that was purportedly obtained from the MACT standards program. A review of this information reveals that, even if one believed the single HCB data point to be valid, EPA has significantly overestimated HCB emissions for the industry. EPA has apparently attempted to perform an HCB emissions calculation estimate for the industry using obsolete data and incorrect calculating methodologies.

Emissions factors for the tire industry reside on EPA's AP-42 web site found at www.epa.gov/ttn/chief/ap-42dsur.html. At this location current HCB emissions factors are noted as follows:

Mixing Compound #3 = 9.29E-09 lb/lb rubber;
Milling Compound #3 = non-detect;
Extruder Compound #3 = 4.98E-09 lb/lb rubber (*interpolated from single mixing data point*);
Calendering Compound #3 = 6.74E-09 lb/lb rubber (*interpolated from single mixing data point*); and
Tire Curing = non-detect for all tires tested

As noted above, HCB was not detected in any other compound tested. It needs to be reiterated at this point that the above values are based on what the industry believes to be an invalid data point, which will be reevaluated shortly through additional emission testing.

Regardless of concerns about the accuracy of these emission factors, when estimating HCB emissions using the above emissions factors EPA must also consider that Compound #3 represents a single tire compound representing about 15% of the rubber actually used in tire manufacturing. It is also important to note that compound #3 is processed through mixing, calendering and/or extruding or milling depending on the equipment configuration used to feed

rubber to the calender. In addition, Compound #3 is cured as part of the tire curing process, but HCB was not detected during any tire curing emission tests.

Using the annual U.S. tire production number found in Table 7-1 of EPA's report (264,262,000 tires produced), and assuming (a) an average tire weight = 25 pounds; (b) rubber content per tire = 85%; (c) amount of Compound #3 per tire = 15%; and (d) the validity of the single data point showing the presence of HCB is valid; one can estimate HCB emissions as follows:

Amount of Compound #3 needed for production:

(264,262,000 tires)x(25 lb/tire)x(90%)x(15%) = 891,884,250 lbs of Compound #3 needed annually

HCB Emissions Estimate for Rubber Mixing Calculation:

(891,884,250 lb rubber)x(9.29E-09 lb HCB/lb Rubber) = 8.3 pounds HCB from Mixing

Estimated HCB Emissions from Rubber Calendering (assuming an extruder pass is used to feed the rubber to the calender – worst case):

(891,884,250 lb rubber)x(4.98E-09 + 6.74E-09 lb HCB/lb rubber) = 10.5 pounds HCB from Calendering operation

Since there are no emission factors for milling or curing, the total HCB emissions would be estimated as follows:

8.3 pounds from mixing + 10.5 pounds from calendering operations = 18.8 pounds HCB (total estimated annual nationwide emissions)

This 18.8 pounds total figure is dramatically less than EPA's estimate of 869 pounds found in Table 7-3 of the 112(c)(6) inventory. The RMA would like to discuss the above HCB emission estimate calculation methodology with EPA. Moreover, as indicated above, the RMA believes that the basis for these calculations, the HCB mixing emission factor for Compound #3 is incorrect and the actual HCB emissions from tire manufacturing are zero. Additional testing will be conducted to confirm this belief.

2 HCB and OCS Cannot be Formed in Rubber Tire Manufacturing

The Battelle report theorizes that HCB and OCS are formed during rubber tire manufacturing. As noted above, the report states that natural rubber contains chlorine and that chlorine combines with carbon and other organic ingredients used in tire manufacturing to form HCB and OCS. However, it is apparent that Battelle has not recognized that two key aspects of the BCB/OCS formation mechanism are not present in tire manufacturing; i.e. the presence of *radical* chlorine and elevated temperatures.

Section 4.1 of the draft report attempts to identify mechanisms for formation of HCB and OCS. A discussion of a "de novo synthesis reaction" is outlined. This discussion of the reaction mechanism contends that elemental carbon and chlorine can combine at elevated temperatures (600-800ºC) and moderate pressure to produce the precursors of HCB and OCS. As the reaction mechanisms continue, smaller chlorinated organic molecules combine to form HCB and OCS. The draft report has linked this mechanism to industries or processes that operate at extremely high temperatures (incinerators, smelters, fuel combustion, etc.) and which commonly involve the presence of highly chlorinated materials. However, the draft report fails to recognize the nature of the processes and operating conditions found in the rubber tire manufacturing industry – and thus draws incorrect conclusions based upon these misunderstandings of the manufacturing process.

A review of the rubber tire manufacturing process reveals that the first of the required elements needed for the chlorination reactions to occur, namely, chlorine. The RMA does not believe that chlorine is present in significant concentrations in natural rubber. If natural rubber does contain chlorine it is likely to be present in extremely small trace amounts and in a form not readily available for the type of reaction chemistry needed to form HCB and OCS. The "de novo synthesis reaction" requires atomic chlorine radicals to be present to react with carbon and other organic molecules. This type of chlorine is not present in rubber tire manufacturing. In addition, tire manufacturing does not involve the type of conditions required to generate atomic chlorine radicals; i.e., extremely elevated temperatures.

Furthermore, the temperatures involved in tire manufacturing are too low for the "de novo synthesis reaction" to occur. Rubber mixing, milling, extruding, and calendering operations in tire manufacturing are typically conducted at temperatures less than 121 ºC. Tire curing operations are typically conducted at less than 175 ºC. These temperatures are significantly lower than the minimum temperature range required for the "de novo synthesis reaction" mechanism to occur, which is 600-800 ºC. Without such elevated temperatures, the reaction chemistry simply cannot occur. Since the temperatures involved in tire manufacturing are significantly less than 600 ºC, the "de novo synthesis reaction" cannot occur in tire manufacturing and HCB/OCS cannot be formed by this mechanism. The Battelle report does not offer another mechanism for HCB and OCS formation in tire manufacturing.

3 General Tire & Rubber Facility – Ashtabula, Ohio

Table 3 of the Battelle report lists Potential Industrial Sources of OCS in the Great Lakes Basin. The table includes a tire manufacturing facility, owned by General Tire & Rubber, located in Ashtabula, Ohio. The RMA is not familiar with such a facility and requests that EPA provide additional information into the location and type of operation conducted at this source so that a proper assessment of its true impact can be evaluated.

Summary

As indicated above, the RMA believes that rubber tire manufacturing is not a source of HCB emissions. Although HCB was detected in the mixing emissions from one rubber compound tested, the RMA believes that the detection was a result of laboratory contamination. Additional testing is being planned. Moreover, the chemistry and temperatures involved do not provide for the formation of HCB and OCS in tire manufacturing. Consequently, the RMA concludes that tire manufacturing is not a source of HCB or OCS impact on the Great Lakes. Therefore, RMA respectfully requests that EPA remove rubber tire manufacturing from its list of possible OCS sources. RMA and its members would be happy to discuss the matters raised in this paper so that EPA has a full understanding of the rubber tire manufacturing process and why it is highly improbable or impossible that HCB or OCS would be emitted from this process.